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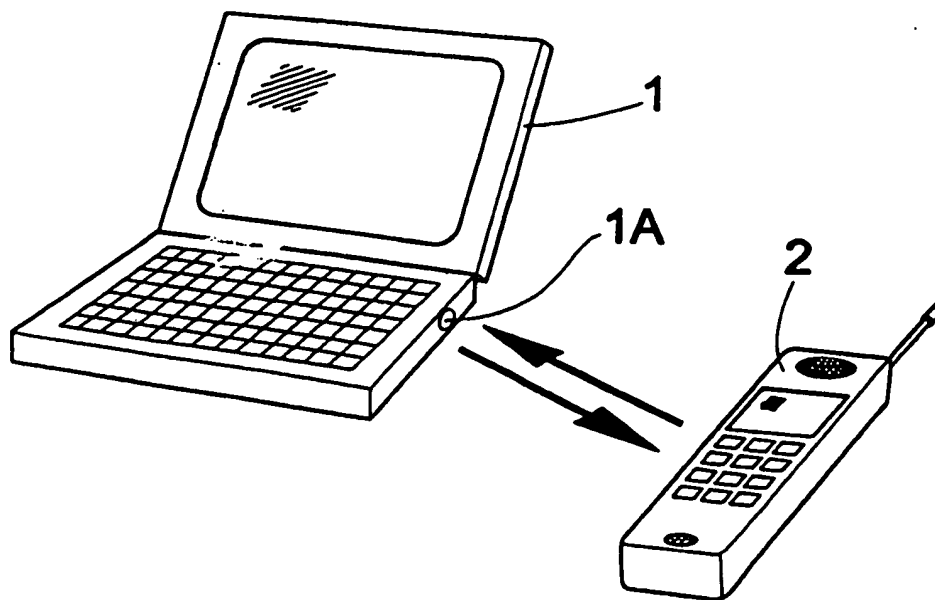
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(54) Title: A DEVICE AND METHOD FOR WIRELESS DATA TRANSMISSION



(57) Abstract

A device in such an appliance as a mobile telephone (2), a lap top computer (1) or the like for wireless data transmission by means of IR light between such appliances comprises means for transmitting IR light and means for receiving IR light. Mainly for reducing the space requirement for the device the means for transmitting and receiving are combined into one LED with a single lens (8), a so called transceiver.

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A DEVICE AND METHOD FOR WIRELESS DATA TRANSMISSION

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Field of the Invention

The present invention relates to a device in such an appliance as a mobile telephone, a lap top computer or the like for wireless data transmission by means of IR light between such appliances, the device comprising means for transmitting IR light and means for receiving IR light. It also relates to a method for such wireless data transmission..

Background of the Invention

15 The normal purposes for a mobile telephone and for a lap top computer, respectively, are well known. Data created in a portable lap top computer may have to be transmitted to a stationary computer or computer network. This is possible not only by means of the traditional floppy disk but also more recently via a mobile telephone system.

Conventionally, the mobile telephone can be connected to the lap top computer by means of a special connecting cord. More recently, however, it has become possible to transmit data between a mobile telephone and a lap top computer wireless by means of IR light. The mobile telephone and the lap top computer are each provided with a device with separate means for transmitting IR light (in the form of an LED) and for receiving such light (in the form of a photodiode). These two means are arranged in a common device, which is intended for mounting on an internal PCB of the appliance and is provided with two lenses, one for each means. The device is also provided with electronic circuitry for the handling of transmitted and received signals.

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The main drawback with such a presently used device is that it occupies a certain volume in an environment where space saving is essential.

The Invention

5 A device which decreases this drawback is according to the invention attained in that one single LED is utilized as the means both for transmitting and receiving IR light. The LED hereby acts as a so called transceiver.

Besides the space saving advantage it is also easier
10 to mount a device according to the invention, and the transmission security can be enhanced by the use of a slightly larger lens. It is also obvious that a device according to the invention can be cost saving in relation to a traditional device.

The Drawing

The invention will be further described below under reference to the accompanying drawing, in which

Fig 1 is a perspective illustration of data transmission between a mobile telephone and a lap top computer,

20 Fig 2 illustrates a known device for transmitting and receiving IR light, and

Fig 3 illustrates a transceiver device according to the invention for transmitting and receiving IR light.

Detailed Description of Embodiments

25 Fig 1 is a schematic illustration of a lap top computer 1 and a mobile telephone 2. Conventionally, data submitted to and from the telephone 2 via the ordinary mobile telephone system from and to an office computer, respectively, is transmitted to the lap top computer over a
30 connecting cord. More recently, however, IR technique has been utilized for the same purpose, as is illustrated in Fig 1.

IR light is created, transmitted and received by suitable means described below and conveniently arranged
35 behind a window 1A in the lap top computer 1 and a similar

window (not shown) in the telephone 2. The data transfer by means of an IR beam of light can be governed by an internationally accepted IrDA standard (IrDA=Infrared Data Association), setting up certain criteria aiming at low cost
5 implementation, low power requirements, directed, point-to-point connectivity, and high noise immunity.

Among features to be noticed are that the transmission can be performed over a distance of say 1 m and that the two devices need not be aligned with any precision.
10 sion.

The established IR link is bi-directional, but transmission and receiving in the form of pulses with a nominal minimum of 1.6 microseconds cannot occur concurrently. The data transmission rate may for example be in the region of
15 115 kbits/second, and the peak wavelength can be 0.85-0.90 μm .

A known device for establishing an IR link is shown in Fig 2. Such a device 3 is to be mounted behind said window in a mobile telephone or a lap top computer, preferably on a PCB (Printed Circuit Board) therein. The device
20 contains a light transmitting LED (Light Emitting Diode) for IR light behind a first lens 4 as well as a light receiving photodiode behind a second lens 5. In the base portion 6 of the device electronic circuitry for handling
25 the transmitted and received signals may be housed.

A device 7 according to the invention for the same purpose as the device 3 of Fig 2 is shown in Fig 3. This device only contains one single LED behind a lens 8. This LED has the dual purpose of both transmitting and receiving
30 IR light. The use of the LED for receiving IR light is based on the knowledge that light transmitted to an LED creates a clearly detectable current from the LED. This LED accordingly acts as a transceiver. The base portion 9 of the device 7 contains electronic circuitry for the handling
35 of the transmitted and received signals.

The size of the device 7 according to the invention may in principle be half as compared to the the prior art device according to Fig 2 without sacrificing any function, which is very advantageous in the design of mobile tele-
5 phones and lap top computers, where a space saving is of outmost importance. Also, the new device may be less energy consuming than the conventional one, which is also very positive.

CLAIMS

1. A device in such an appliance as a mobile telephone (2), a lap top computer (1) or the like for wireless data transmission by means of IR light between such appliances, the device (7) comprising means for transmitting IR light and means for receiving IR light, characterized in that one single LED is utilized as the means both for transmitting and receiving IR light.

2. A device according to claim 1, characterized in that the device (7) besides the LED with its single lens (8) contains electronic circuitry for the handling of the transmitted and received signals.

3. A method for wireless data transmission to and from such appliances as a mobile telephone (2), a lap top computer (1) or the like by means of IR light, characterized in that IR light is transmitted from and received by one single LED.

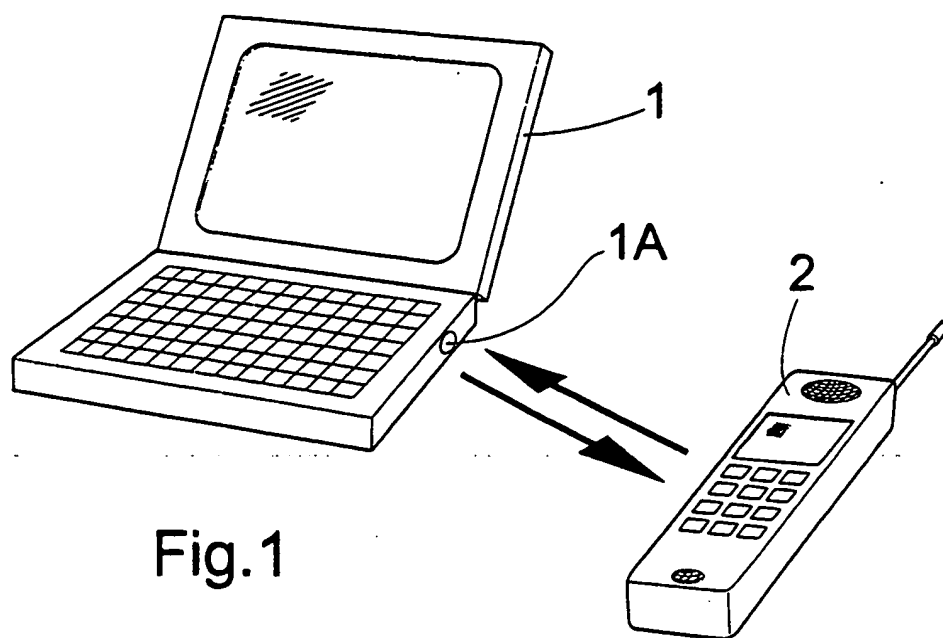


Fig. 1

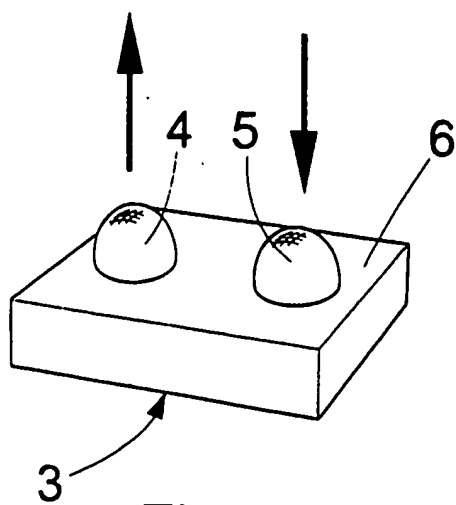


Fig. 2

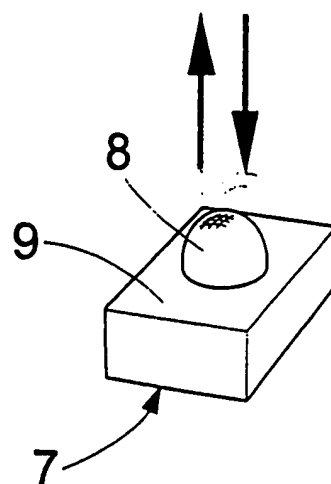


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/00617

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04B 10/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5470154 A (J. NISHIZAWA ET AL), 28 November 1995 (28.11.95), column 4, line 51 - line 55 --	1-3
A	US 5459336 A (T.KATO), 17 October 1995 (17.10.95), column 2, line 62 - column 3, line 10 --	1-3
A	US 5307297 A (S. IGUCHI ET AL), 26 April 1994 (26.04.94), see the whole document --	1-3
A	US 4829168 A (T. NAKAHARA), 9 May 1989 (09.05.89), column 2, line 61 - column 3, line 13 --	1-3

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4460259 A (J.E. GREIVENKAMP JR. ET AL), 17 July 1984 (17.07.84), column 3, line 28 - line 42, figure 3 --	1-3
A	GB 2298752 A (NEC CORPORATION), 11 Sept 1996 (11.09.96), see the whole document -- -----	1-3

INTERNATIONAL SEARCH REPORT

Information on patent family members

28/09/99

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PCT/SE 99/00617

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5470154 A	28/11/95	CA 2085612 A DE 69220638 D,T EP 0535252 A,B JP 2863663 B JP 5099846 A WO 9218855 A	19/10/92 16/10/97 07/04/93 03/03/99 23/04/93 29/10/92
US 5459336 A	17/10/95	DE 69306457 D,T EP 0566278 A,B JP 2806146 B JP 5299688 A	03/04/97 20/10/93 30/09/98 12/11/93
US 5307297 A	26/04/94	JP 2730810 B JP 4335467 A	25/03/98 24/11/92
US 4829168 A	09/05/89	JP 62256283 A	07/11/87
US 4460259 A	17/07/84	GB 2122835 A,B HK 8387 A	18/01/84 28/01/87
GB 2298752 A	11/09/96	AU 695083 B AU 4790196 A CA 2170810 A GB 9604791 D JP 8242205 A	06/08/98 19/09/96 07/09/96 00/00/00 17/09/96

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